CLAIMS

What is claimed is:

1. A method of activating or augmenting an immune system of a mammal which comprises administering an isothiocyanate (ITC) based agent to a mammal in need of such treatment in an amount effective to activate or augment an immune response in the mammal.

2. The method of claim 1, wherein the ITC-based agent is N-acetylcysteine conjugate of phenethyl isothiocyanate (PEITC-*N*AC) or phenethyl isothiocyanate (PEITC).

3. The method of claim 1, wherein the ITC-based agent activates or augments the production of specific antibodies of a B cell system to an antigen.

4. The method of claim 1, wherein the agent activates or augments innate immunity.

5. The method of claim 4, wherein the ITC-based agent activates or augments a NK cell system.

6. The method of claim 1, wherein the mammal is a patient having an immunodeficiency or an infection.

7. The method of claim 6, wherein the patient has AIDS or SARS.

8. The method of claim 1, wherein the mammal is a patient having cancer, and the ITC-based agent is administered in an amount sufficient to activate a B cell immune system by production of one or more antibodies specific to a cancer antigen.

9. The method of claim 8, wherein the ITC-based agent activates the NK cell system to destroy cancer cells.

10. The method of claim 8, wherein the ITC-based agent is administered in combination with an additional agent selected from the group consisting of radiotherapeutic agents, hormonal therapy agents, immunotherapeutic agents, chemotherapeutic agents, cryotherapeutic agents and gene therapy agents.

11. The method of claim 1, wherein the ITC-based agent is administered in combination with a vaccine to augment the immune response to the vaccine.

12. The method of claim 1, wherein the mammal is one that is suffering from a condition relating to insufficient T-cell functions and the amount of the ITC-based agent administered augments the immune response of the B cell and innate immunity systems in the mammal.

13. The method of claim 1, wherein the mammal is one that suffers from an infection wherein the amount of the ITC-based agent administered augments the production of antibody specific to the infectious agent.

14. The method of claim 1, wherein the ITC-based agent is administered orally, intravenously, or topically.

15. The method of claim 14, wherein the ITC-based agent is administered systemically in a dietary composition or supplement.

16. A method of activating or augmenting an antigen-specific immune response in a subject in need of such treatment which comprises administering to the subject an isothiocyanate (ITC) based agent in an amount effective to activate or augment a B cell system response or an innate immunity response to an antigen.

17. The method of claim 16, wherein the ITC-based agent is N-acetylcysteine conjugate of phenethyl isothiocyanate (PEITC-*N*AC) or phenethyl isothiocyanate (PEITC).

18. The method of claim 16, wherein B and NK cell numbers augment.

19. The method of claim 18, wherein the ITC-based agent is administered to activate or augment production of antibodies specific to a cancer cell antigen.

20. The method of claim 17, wherein the PEITC-*N*AC or PEITC is administered in combination with an additional agent selected from the group consisting of radiotherapeutic agents, hormonal therapy agents, immunotherapeutic agents, chemotherapeutic agents, cryotherapeutic agents and gene therapy agents.

21. The method of claim 16, wherein the antigen is associated with a xenogeneic cell or antigen.

22. The method of claim 16, wherein the ITC-based agent is administered in combination with a vaccine.

23. The method of claim 21, wherein the mammal is a patient that has cancer and the therapeutic amount of an isothiocyanate (ITC) based agent is sufficient to increase levels of endogenous cyclin-dependent kinase inhibitors.

24. The method of claim 23, wherein the endogenous cyclin-dependent kinase inhibitors are p15INK4B, p16INK4A, p18INK4C, p19INK4D, p21WAF-1/Cip-1, p27Kip1 and/or p57.

25. The method of claim 23, wherein the inhibitors inhibit cyclin-dependent kinases.

26. The method of claim 22, wherein the expression of cyclin D and E is reduced.

27. The method of claim 23, wherein the ITC-based agent is N-acetylcysteine conjugate of phenethyl isothiocyanate (PEITC-*N*AC) or phenethyl isothiocyanate (PEITC).

28. The method of claim 26, wherein the mammal is a patient that has cancer and the therapeutic amount of PEITC-*N*AC or PEITC is administered to inhibit Rb phosphorylation in cancer cells *in vivo*.